Research finding: Morning exercise beneficial to students

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UVM psychological scientist Betsy Hoza's research finding: thirty minutes of exercise before school has positive effects on all kids' behavior, including those at risk for developing ADHD. Credit: Joshua Brown

Many school-age children happily engage in traditional physical games such as tag and "sharks and minnows" that allow them to run around with friends and schoolmates, blow off a little steam, take turns being "it," and have fun. Teachers and parents have long thought that routinely making time for such activities can have a positive effect on kids' moods and behaviors, and now researchers are documenting just that.

Betsy Hoza, Bishop Joyce Chair of Human Development and professor

of psychological science, was the lead author on a recent study that looked at whether a half-hour of aerobic physical activity in the morning had an impact on either children at risk for developing Attention-Deficit/Hyperactivity Disorder (ADHD) or children who are developing typically. In an article published in the September issue of the *Journal of Abnormal Child Psychology*, Hoza and her colleagues observed that in fact it does, and in both groups.

"Since both kids at ADHD risk and typically developing kids benefitted," says Hoza, "the take-home message is that aerobic physical activity before school is a do-no-harm intervention."

Collaborating with Purdue University on the randomized clinical trial of 202 Vermont- and Indiana-based kindergarten, first- and second-grade students who were racially and ethnically diverse and nearly evenly split between boys and girls (54 to 46 percent), Hoza and her colleagues sought to determine what would be the effects—if any—of activity on attention and moodiness. The students were roughly divided between those who were typically developing and those at risk of ADHD, as determined by parent and teacher screening assessments on ADHD symptoms, including hyperactivity/impulsivity and inattention. Anyone who was taking medication for ADHD symptoms at the study's outset was excluded, although researchers did not restrict students from beginning such medications once the study was under way. (Four students did start taking medication for treatment of ADHD during the course of the study; Hoza and her colleagues analyzed their data both with and without those children, and found the results unchanged.)

For 12 weeks, students spent a half-hour before school engaged in either a sedentary, classroom-based intervention or a series of games that required moderate to vigorous aerobic activity. The games were changed frequently so as to maintain participants' attention: they'd begin with a two-minute activity such as tag before switching to three nine-minute

stations that might include "capture the flag," an aerobic obstacle course, "spiders and flies" (a variant of tag), or "follow the leader," before ending with another two-minute large-group activity. Over the course of 31 minutes, then, the participants engaged in a total of five different activities or games.

Parents and teachers were asked to rate participants' behavior both before and after the program. Parents noticed a moderate decrease in ADHD symptoms in response to the increase in physical activity, while teachers also noticed a decrease, though to a lesser extent. In addition, parents reported a significant drop in oppositional behaviors, peer functioning, and moodiness in those children who had been deemed at-risk for developing ADHD. They also saw improvements on multiple outcomes in the typically developing children who engaged in physical activity. The researchers hypothesized that teachers' need to pay attention to a large group of children might have meant they focused more on the "high-maintenance" students and were less able to notice changes in those who were generally well behaved.

"The primary results—the ones that were strongest—were in the home setting," says Hoza, "but when we did some follow-up analyses that were a little less conservative, we found improvements both by parent and teacher report." The researchers did see some changes in the structured classroom activity group, she says, but they were more pronounced in the physical activity group.

Hoza, whose work addresses the social, academic, and self-system functioning of children with ADHD from a developmental psychopathology perspective, notes that this is the first large-scale randomized clinical trial to look at this question in a sample of kids with ADHD or at risk of ADHD, and says that while they are continuing to sift through the data, more research is needed to confirm her team's results. One 2013 study at Michigan State compared the acute effects of

aerobic physical activity and medication, but no one has yet looked at the former as a long-term strategy for managing the disorder, and that's something Hoza would like to see.

"If the finding holds up, I think this would be a really useful management strategy for individuals with ADHD—not only at a young age, for kids entering school," she says. "ADHD is a chronic disorder that typically persists throughout the lifespan, so this would suggest that regular aerobic physical activity could be one strategy used to manage the disorder over the long term."

In the meantime, she's awaiting word on external funding that would support a study of how schools could best implement the kind of regular physical activity that was the basis of this research, using a manual and training she and her colleagues developed. Their goal is to create a practical, low-cost program that schools could run on their own to ensure their students are both active and focused.

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